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MORIBAETIS MIMBRESAURUS, NEW SPECIES (EPHEMEROPTERA: BAETIDAE): FIRST REPRESENTATIVE OF THE GENUS NORTH OF MEXICO

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Abstract.—Unusually large baetid mayfly adults from Coconino County, Arizona, USA are described as ***Moribaetis mimbresaurus*, new species**. The new species represents the first known occurrence of the genus *Moribaetis* Waltz and McCafferty north of the Neotropical Region. It is distinguished from Central American congeners by having double cubito-anal intercalary veins and limited pigmentation in the forewings, and a non-forked second longitudinal vein in the hindwing.

Key Words: mayflies, new species, new USA generic record, Baetidae

While working on the identification of an extensive collection of alate mayflies made by M. S. Sanderson in parts of Arizona during the 1980s and kindly donated by him to the Purdue Entomological Research Collection, I came upon highly unusual Baetidae adults that were not readily identifiable to any known genus from the USA. Their relatively large size was not known for any Nearctic small minnow mayflies (Baetidae) other than some *Callibaetis* Eaton, and they clearly did not belong to that group (e.g., they lacked both crossvenation in the hindwings and body speckling). The largest non-*Callibaetis* baetids in the USA have included *Baetis magnus* McCafferty and Waltz (throughout much of the western USA) and the little-known *B. palisadi* Mayo (only from California), but the Arizona mayflies in question were considerably larger than those species. The combination of large size, membrane pigmentation in the forewing, the basally margined, distally oriented, sharp costal process of the hindwing, short stalk of the turbinate eye, and small terminal segment of the genital forceps indicated that the mayflies in question represented a new species with an obvious affinity with Central American species of the genus *Moribaetis* Waltz and McCafferty.

Moribaetis has been known as a Western Hemisphere group ranging from tropical South America to southern Mexico, with three well-described nominal species common to Central America (Waltz and McCafferty 1985, Lugo-Ortiz and McCafferty 1996). Nominal South American species are poorly known and dubius (see below). *Moribaetis* represents a relatively plesiotypic genus among the *Baetodes* complex of genera (Lugo-Ortiz and McCafferty 1996, McCafferty and Baumgardner 2003), a distinctive clade of Baetidae restricted to the Western Hemisphere and of Neotropical origin (McCafferty 1998).

The purpose of this paper is to describe the newly discovered species of *Moribaetis*. This discovery is significant because the new species represents a disjunct country record for the genus, is

exceptionally large for USA baetines, and is possibly rare because presumably it would be difficult to overlook such a mayfly if it were common in Arizona, a state whose mayfly fauna has been relatively well studied (see Lugo-Ortiz and McCafferty 1995).

Moribaetis mimbresaurus McCafferty, new species

(Figs. 1–5)

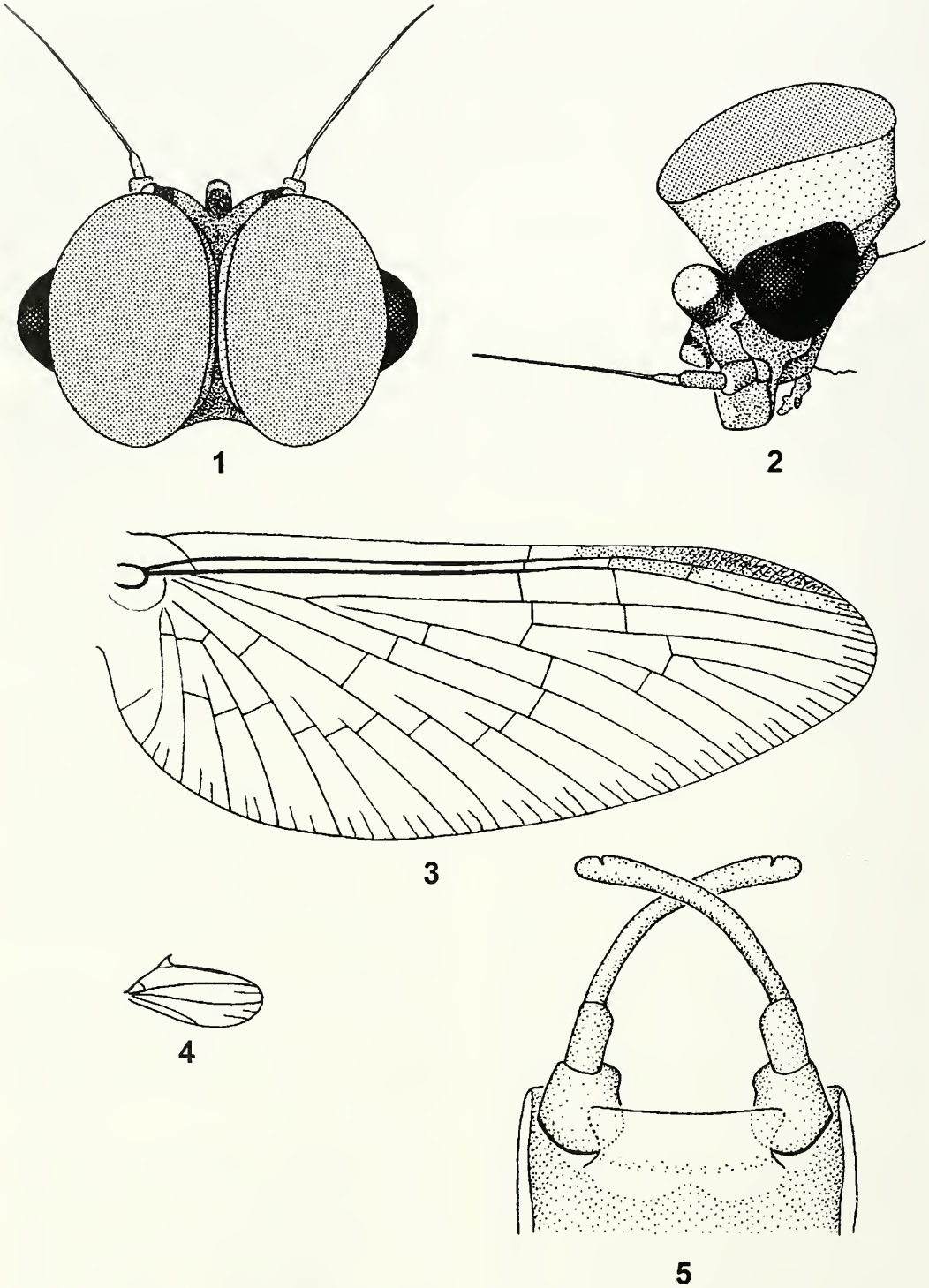
Male adult.—Body length 9.3–9.5 mm. Forewing length 9.6–10.0 mm. Hindwing length 1.2 mm. Cercus length 19.0 mm. General coloration light to medium brown. Head with turbinate eyes ovoid, yellow, and approximate (Fig. 1); stalk of turbinate eye relatively short and yellow (Fig. 2). Scape and pedicel somewhat darkened basally. Thorax with all nota medium brown (pronotum somewhat darker). Mesonotum with some highlights posteriorly. Mesopleurum pale with profuse medium and dark brown markings. Forefemur light brown with medium brown cloud apically on both surfaces. Foretibia and foretarsus somewhat darker than forefemur and with distinct markings. Mid- and hindlegs pale throughout except femora with brown cloud apically as per foreleg. Forewing (Fig. 3) with tan infuscation limited to distal half of costal and subcostal areas; costal crossveins profuse and somewhat anastomose; marginal intercalary veins double throughout (very difficult to see in anal region). Hindwing (Fig. 4) with distally pointed, sharp costal process with basal margination, and with three longitudinal veins; second longitudinal vein not forked; one marginal intercalary vein between first and second longitudinal veins; two marginal intercalary veins following second longitudinal vein and ending in distal margin; third longitudinal vein shorter and ending in anal margin. Abdomen with terga light brown and unmarked, with terga 7–10 somewhat darker, and with some dark brown infuscation distally on tergum 10. Sterna pale cream; sterna 2–7 submedially with pair of short, oblique, light brown dashes followed posteriorly by pair of small, light brown dots. Genitalia as in Fig. 5: forceps bases very well demarcated and with some distomedial development; apical forceps segment short and set off by lateral indentation only; subgenital plate prominent and with straight distal border for entire distance between forceps. Cercus uniformly light brown.

Female adult.—Body length 10.1 mm. Forewing length 10.1 mm. Hindwing length 1.2 mm. Cercus length unknown. Coloration as per male, except markings not as apparent in some. Wing venation as described for male, although in some, basal margin of hindwing costal process not as distinct as in male and marginal intercalary veins of hindwing not as distinctive.

Material examined.—Holotype: ♂ adult, Arizona, Coconino Co, Oak Cr at pumphouse wash (floating on water), 3-III-1984, M. W. Sanderson (deposited in the Purdue Entomological Research Collection, West Lafayette, Indiana). Other material: 1 ♂ adult (some parts dissected, in microvial and on slide), and 2 ♀ adults (some parts dissected on slide), same locale and depostion data as holotype.

Etymology.—The specific epithet is a compound noun in apposition and an allusion to the lizard shape typified in drawings of the ancient Mimbres culture of the Southwest.

Discussion.—*Moribaetis mimbresaurus* represents the sixth currently recognized species of the genus *Moribaetis*, although the two recognized South American species, *M. aneto* (Traver) and *M. comes* (Navás), remain poorly known and provisional at this time (Lugo-Ortiz and McCafferty 1999, McCafferty 2000). The only other South American name



Figs. 1–5. *Moribaetis minibresaurus*, male adult. 1, Head (dorsal). 2, Head (lateral). 3, Forewing. 4, Hindwing. 5, Genitalia (ventral).

referred to *Moribaetis, M. socius* (Needham and Murphy), is a *nomen dubium* and not counted among the six recognized species.

The new species differs from the other species of *Moribaetis* in having the pigmented infuscation of the membrane of the forewing limited to the distal costal and subcostal area, and crossventation in the distal costal area somewhat anastomose. Central American species are known to have various degrees of patterned pigmentation in the forewing. The two recognized South American species are devoid of wing pigmentation except perhaps at the wing base, and they differ also from the North-Central American forms in that they have a less distinct costal process of the hindwing that is not set off or distally oriented, and are considerably smaller in body size. The new species also differs from the other *Moribaetis* adults, except for the South American *M. aneto* (Traver), in not having the second longitudinal vein of the hindwing forked, although otherwise the hindwing venation is quite similar. In addition, although it is common for the Central American species to have triple marginal intercalaries in the cubito-anal cells of the forewing, these veins are double in *M. mimbresaurus*. This character is not resolved for the two South American species. For comparisons, the other pertinent adult descriptions of Central American *Moribaetis* species, including figures of the wings, are as follows: *M. salvini* (Eaton): Eaton (1885, plate 16, fig. 29a); *M. maculipennis* (Flowers): Flowers (1979, figs. 1–5); and *M. macaferti* Waltz: McCafferty and Lugo-Ortiz (1998, figs. 1–8).

The venational traits of *M. mimbresaurus* (double marginal intercalaries in the cubito-anal cells of the forewing and non-forked main veins in the hindwing) are apparently plesiomorphic with respect to the Central-North American species of *Moribaetis*, whereas the anastomose distal costal crossvenation could be viewed as autapomorphic within the group. This could suggest that *M. mimbresaurus* is a basal lineage among the Central-North American species, and furthermore based on its geographic distribution that it is relictual in Arizona, possibly having been much more widespread in Mexico and Central America at one time. Future discovery of the larval stage of the species should shed considerable light on these possibilities.

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